

PATENT COOPERATION TREATY

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From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

To:

see form PCT/ISA/220

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/EP2004/003472

International filing date (day/month/year)
01.04.2004

Priority date (day/month/year)
17.10.2003

International Patent Classification (IPC) or both national classification and IPC
H05B33/28, H01L51/30, H01L51/20

Applicant
INFN ISTITUTO NAZIONALE PER LA FISICA DELLA ...

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☒ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☒ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:



European Patent Office
D-80298 Munich
Tel. +49 89 2399 - 0 Tx: 523656 epmu d
Fax: +49 89 2399 - 4465

Authorized Officer

Pusch, C

Telephone No. +49 89 2399-7023



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WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/EP2004/003472

IAP20 Rec'd PCT/PTO 17 APR 2006

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
☐ a sequence listing
☐ table(s) related to the sequence listing
 - b. format of material:
☐ in written format
☐ in computer readable form
 - c. time of filing/furnishing:
☐ contained in the international application as filed.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/EP2004/003472

Box No. II Priority

1. ☒ The following document has not been furnished:

☒ copy of the earlier application whose priority has been claimed (Rule 43*bis*.1 and 66.7(a)).

☐ translation of the earlier application whose priority has been claimed (Rule 43*bis*.1 and 66.7(b)).

Consequently it has not been possible to consider the validity of the priority claim. This opinion has nevertheless been established on the assumption that the relevant date is the claimed priority date.

2. ☐ This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43*bis*.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.

3. Additional observations, if necessary:

Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	
	No: Claims	1 - 15
Inventive step (IS)	Yes: Claims	
	No: Claims	1 - 15
Industrial applicability (IA)	Yes: Claims	1 - 15
	No: Claims	

2. Citations and explanations

see separate sheet

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING
AUTHORITY (SEPARATE SHEET)**

PCT/EP04/03472

Re Item V

Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1.0 The following documents (D) are referred to in this communication; the numbering will be adhered to in the rest of the procedure:

D1: EP-A-1 117 137
D2: WO-A-03/019598
D3: US-B1-6 309 901

2.1 D1 fully anticipates the subject-matter of claim 1 by describing an electro active photonic device (abstract and fig. 1) comprising a substrate (50), at least one cathode layer (10), at least one anode layer (40), and at least one layer of active material based on an organic compound ((30) and paragraphs [0046] and [0047]) and interposed at least partially between the anode and cathode layers, the said layers being arranged on the substrate in a predetermined configuration such that the device can convert luminous energy into electrical energy, characterized in that the substrate is made of float glass (p. 6, paragraph [0028], especially l. 6).

The subject-matter of claim 1 is not new (Art. 33(2) PCT).

2.2 D1 also describes the features of claims 2 - 8, 12, and 14, rendering their subject-matter not novel.

claim 2: tempered glass (p. 15, l. 10);

claim 3: transparent electrode (ITO paragraph [0025])

claim 4: both of the electrodes are transparent (paragraph [0062] or [0067])

claim 5: thin metal electrodes (paragraphs [0025] and [0060]). The suggested thicknesses of .02 μm to 10 μm or 3 nm - 1 μm (paragraph [0061]) are considered to be thin.

claim 6: anode of gold (paragraph [0025])

claim 7: cathode of aluminium (paragraph [0060])

claim 8: hole transport layer between anode layer and the active material
(paragraph [0016])

claim 12: encapsulation layer (paragraphs [0077]/[0078])

claim 14: solar cell (paragraph [0001]).

- 2.3 The subject-matter of claims 1, 3, 5, 7 - 11, and 13 is known from D2 and therefore lacks novelty:

claim 1: OLED on float glass (title, p. 8, l. 34, p. 4, l. 7 - 14)

claim 3: transparent electrode layers (p. 3, l. 19 or p. 9, l. 16/17)

claims 5 and 7: transparent anode layer of Al (p. 11, l. 7, an Al layer of 100 nm thickness is transparent to light)

claims 8 - 11: hole and/or electron transport layers (p. 4, l. 22 24 and p. 9, l. 28 - 31)

claims 13: OLED (p. 4, l. 7/8).

- 2.4 The teaching of D3 destroys the novelty of claims 1, 3, 8, 13, and 15:

claim 1: OLED on float glass (col. 1, l. 39/40, col. 3, l. 19, and col. 8, l. 35 - 39)

claim 3: transparent electrode (col. 6, l. 55 - 59)

claim 8: hole transport layer (col. 8, l. 37)

claim 13: OLED (see citation for claim 1)

claim 15: plurality of OLEDs (col. 5, l. 1)

- 3.0 The present application does not meet the requirements of Article 33(3) PCT, because the subject-matter of claims 1 - 15 does not involve an inventive step in the sense of Article 33(3) PCT.

- 3.1 Claim 1: Electro active photonic devices are commonly fabricated on glass substrates. The skilled person will select a substrate made of float glass because it is easily available and cheap.

- 3.2 Claim 2: When wishing to render the float glass substrate less breakable, the skilled person will consider tempering it.

- 3.3 Claim 3: As light is to enter or leave the electro active photonic device, either one of the electrodes must be transparent or the light is emitted/irradiated from a side from/onto the "active material". The skilled person will choose from these known possibilities according to the geometric design of the device.
- 3.4 Claim 4 : In order to optimise absorption from light, the skilled person will render both electrodes transparent.
- 3.5 Claims 5 - 7: Gold is known as an anode material in organic electro active photonic devices for its high work function (5.4 eV) and aluminium as a cathode material for its low work function (4.2 eV). The selection of these materials therefore cannot be considered inventive. Furthermore, the skilled person knows that films of these metals of a thickness of less than 250 nm are transparent to light and will make these film transparent when circumstance makes it desirable.
- 3.6 Claims 8 - 11: It is commonly known that hole transport and electron transport layers enhance the performance of electro active photonic devices. The compounds selected in claims 9 or 11 are well known in the field of organic electro active photonic devices for their hole or electron transport properties.
- 3.7 Claim 12: Any electronic device is typically encapsulated in order to protect it from degrading due to mechanical or chemical damage (scratches, humidity etc.).
- 3.8 Claim 13 - 15: An electro active photonic device either converts luminous energy into electrical energy (photovoltaic device or solar cell) or electrical energy into luminous energy (OLED). Arrays or panels of OLEDs are known as e.g. flat panel device.

Re Item VII

- 4.0 The application does not meet the requirements of Article 6 PCT, because claims 5 and 15 are not clear.
- 4.1 Claim 5 is worded to be dependent on claims 4 and 5. In this written opinion it is assumed that claim 5 should be dependent on claims 3 and 4.

**WRITTEN OPINION OF THE
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International application No.

PCT/EP04/03472

- 4.2 The "expression "in particular" has no limiting effect on the scope of claim 15 but denotes a merely optional feature. The feature of "for illumination or indication" following this expression is therefore omitted.